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the coast, trade was precisely in the condition we find it now in the interior. The natives knew nothing of the collection of valuable products, — knew not, indeed, of their existence until shown. Now, on the coast, and for a hundred and two hundred miles inland, they have learned the demands of trade, and a regular collection is made by them of rubber, calumba, orchilla, and copal.

So far, we have spoken only of the export of produce indigenous to the country. When Europeans, however, begin to settle in it, — and in a small way this settlement has already begun, — fresh sources of wealth are opened up; and other products, for which the climate and soil are found favorable, are cultivated, and their export forms a valuable adjunct to that of the natural products of the country. Coffee and sugar have already been raised with success; and wheat, tea, and cinchona are all undergoing trial. The coffee and sugar consumed at the mission-stations are mostly home or Nyassa grown, and very good in flavor and strength. Recently Angora goats have been introduced for the production of mohair.

The climate of this region, which is from three thousand to five thousand feet above sea-level, is considered comparatively healthy, and, although it is not probable that it will ever become the home of a numerous white population, is well adapted to the establishment of plantations, worked by natives and managed by whites. The lake itself, which is only sixteen hundred feet above sea-level, has not as favorable a climate as have the slopes of the highlands.

The most important feature of the Nyassa region is its easy access. The uplands surrounding the Nyassa are divided by the only navigable waterway to the coast of Africa, and this alone marks it out as one of the first districts of East Central Africa for European occupation. There is nothing like it farther south, where European settlers are steadily advancing. To be able to step into a river-steamer at a seaport, as may be done now at the mouth of the Zambezi, and be carried up in five or six days to the foot of the Shire highlands, within a day's walk of the first settlements, is an immense step already gained. The new river-steamer plying on the Shire and Zambezi is a stern-wheeler, intended to carry seventy-five tons on a moderate draught. There is also a steamer of considerable size in course of construction on Lake Nyassa.

The trading company of Lake Nyassa, and the missions of that region, — the Free Church of Scotland Missions, which occupy the west coast of the lake; the Universities' Mission, which occupies the east coast of the lake, — have expended altogether some \$750,000 on this region. In pursuance of these objects, a survey was made of a road for about forty-six miles through the rough country of Lake Nyassa, towards Lake Tanganyika, which is reached from the terminal point of that road through an easy country. The road was made by native labor, and the traffic on it was at first worked by parties hired by the company from the Nkonde, Wanda, and Mambwe tribes, with all of whom the company made treaties by which its authority was recognized over these districts. At present its management has, however, slipped into the hands of the Arabs, who purchase goods at the Nyassa terminus, and convey them by their own people, often slaves, to Lake Tanganyika, the European staff being too limited in numbers to superintend all the stations required.

The steady advance of commerce in this region is seriously threatened by the progress of the Arabs, who have recently also invaded this country. For ninety miles along the south coast of Lake Tanganyika almost the whole population has been swept away or scattered, and in the adjoining fertile country of Ufipa the Arabs are now in great force.

During the last year, letters from the mission-stations expressed apprehensions, on account of the presence near Lake Nyassa of an Arab trader who had formerly made slave-raids in the Tanganyika region. These traders have congregated in numbers at the Nyassa end of the road, on account of the small steamer of the African Lakes Company having been for some time detained on account of disturbances. At various points besides the north end of the lake, the Arab invaders are ready, and have added to their old station at Kota-Kota one near Bandawe Mission; and besides Losewa and Makanjiva's, they have been aggressive near Blantyre.

All reports make it an undoubted fact that the question of commercial progress in Central Africa will solely depend upon the out-

come of the present struggle between Arabs and Europeans. The raids of the former are extending continually westward; and, wherever they have invaded a country, nothing but ruin remains. It appears doubtful whether the joint action of the European nations will succeed in breaking the power of the Arabs in the inaccessible fastnesses of Central Africa. It seems that the only means of success would be an absolute stoppage of the introduction of firearms, which would deprive the Arabs of a great part of their superiority over the native states.

BOOK-REVIEWS.

Occasional Addresses on Educational Subjects. By S. S. LAURIE. Cambridge, Eng., University Pr. 12°. (New York, Macmillan, \$1.25.)

PROFESSOR LAURIE, well known as lecturer on educational history and methods in the University of Edinburgh, here gives us another volume on his favorite themes. In it he touches on a great variety of educational topics, and handles most of them with ability as well as enthusiasm. Professor Laurie believes in the importance of studying educational theories and methods, and holds that no teacher is properly equipped for his work who has not been through a course of such study; and he gives excellent arguments and illustrations in support of this view. In regard to both subjects of study and methods of teaching, he is at issue with some enthusiasts of the present day, and especially with the advocates of manual training and competitive examinations. With respect to the latter, he takes the ground that competition in school is in its nature an evil, since it fosters "the desire to beat others, and exalt self over others," which he justly affirms to be anti-social. Moreover, he maintains that educational competition does not secure the best service to society. The whole lecture on this subject ought to be carefully read by American educators. He is opposed to free schools, and presents the well-worn arguments against them, but without adding any thing new.

With regard to subjects of study, Professor Laurie is a strong advocate of the humanities. He believes in technical schools in their proper place, but speaks slightly of manual training in ordinary schools, remarking, that, "if the spirit of man can be educated through his fingers, it is a pity that Plato and Shakspeare ever wrote, and Christ ever taught." The end of education, in his view, is not to make good workmen, but good men; and his school curriculum is arranged accordingly. He would abandon Greek as a required study, because of the importance of French and German, and would base the course of study in secondary schools on English and Latin. He has a strong and, we think, sound sense of the educational importance of literature, especially in its moral and æsthetic aspects; and he would also devote considerable time to national history and politics. Of the physical sciences he would teach only geography, which seems a very narrow view; though it must be added that he would have geography taught in a very wide and liberal spirit. In mathematics he would teach only the elementary branches; and in French and German, as much as there is time for. This programme is sure to provoke criticism, from the scientists at least; but Professor Laurie is evidently not averse to controversy. His whole book is very suggestive, and we trust will not be overlooked by any one interested in education.

A Treatise on Hydraulics. By MANSFIELD MERRIMAN. New York, Wiley. 8°. \$3.50.

THIS volume is intended mainly for the use of students in technical schools, and consequently the subject has been treated, and the material selected and arranged, with a view to meet the requirements of such students. The author, who is professor of civil engineering in Lehigh University, is gifted with a perspicuous and pleasing style, and has produced a book which will without doubt prove an acceptable text-book upon the subject. A brief interesting chapter is devoted to the units of measure, physical properties of water, atmospheric pressure, gravity, and computations. A few hints on methods of study, appended to this chapter, would be of service to students in any department of science. Then follow in regular order chapters on hydrostatics, theoretical hydraulics, and the flow of water through orifices, over weirs and in

tubes, pipes, canals, and rivers. The measurement of water-power, the dynamic pressure of flowing water, hydraulic motors, and naval hydro-mechanics are treated in separate chapters, the latter subjects being given less space than their importance would seem to warrant. The book is amply illustrated.

A General Formula for the Uniform Flow of Water in Rivers and other Channels. By E. GANGUILLET and W. R. KUTTER. Tr., with additions, by Rudolph Hering and John C. Trautwine, Jun. New York, Wiley; London, E. and F. N. Spon. 8°. \$4.

To all engaged in the study of hydraulic problems, as well as to engineers who deal with the flow of water, this book will be of great service. It is the first published translation of the authors' chief work on the subject; though unauthorized translations from articles in German periodicals on this subject, by the same authors, were published in London several years ago. The first part of the work is devoted mainly to historical matter, and to a review of present knowledge of the laws governing the flow of water. A treatise on the new formula, showing its close agreement with a large number of experimental results obtained under differing conditions, makes up the second part. A supplement contains a more direct method of deriving the formula, for the benefit of those who desire mathematical brevity. A second general formula is also sketched, though not made prominent, as the first one is considered preferable.

The translators call attention to the fact that the authors have been erroneously regarded as holding their formula to be scientifically perfect, and covering both possible and impossible conditions of flow. They disclaim for them any such intention, insisting, that, as the formula is purely and essentially empirical, it must not be expected to apply to cases beyond the range of the data from which it has been derived. Its application is limited to cases where the slope of the water-surface can be ascertained with a degree of accuracy sufficient for the given case.

Nine appendices and five tables for practical use, which form part of the volume, contain much additional matter of value to those interested in the subject. In Appendices I. to IV. are given extracts from the works of Mr. Kutter upon the formula. Appendix V. contains directions for constructing the diagram used for a graphical solution of the formula. Appendix VI. is devoted to Kutter's modification of Bazin's general formula, useful for special purposes because of its simplicity. In Appendix VII. are given a number of formulæ and data concerning the relation between the mean and surface velocities in streams; the views of a number of investigators on velocities beyond which a scouring of the bed takes place in channels formed of different materials, are given in Appendix VIII.; and an account of Harlacher's method of ascertaining the discharge of rivers, in Appendix IX.

In Table I. are collected the hydraulic elements of over 1,200 gaugings, made in 300 different channels and pipes, under varying conditions of mean hydraulic depth and slope. In the original work the corresponding table is confined to 81 gaugings; so that this table is virtually the work of the translators, who believe it to be the most complete and comprehensive one yet published. The other tables contain the computed values of different elements of the formula, and the conversion of units of measure. An immense amount of labor has been bestowed upon this work by translators as well as authors.

AMONG THE PUBLISHERS.

THE delay in the publication of Sir Monier Williams's book on Buddhism has been caused by difficulties which have arisen in connection with the illustrations. A certain number of copies will be in Mr. Murray's hands at once. The work will be published in America by Macmillan & Co.

— Lee & Shepard have in press Samuel Adams Drake's "Decisive Events in American History, Burgoyne's Invasion of 1777, with an Outline Sketch of the American Invasion of Canada, 1775-76." It will be an admirable historic narrative, intended to be used as a text-book, or as a supplementary reader in schools, as well as for general reading. A valuable book, arranged especially for

young people, yet by no means unsuited to any time of life, entitled "Every-Day Business: Notes on its Practical Details," by M. S. Emery, will be published soon by this house. It gives careful instruction regarding many matters closely connected with business transactions. The book will be a valuable companion for young people, and its pages will contain instructions on business subjects, being designed for ready reference, and also as a text-book for use in schools.

— Macmillan & Co. will publish shortly "Natural Inheritance," by Francis Galton; a second series of Sir John Lubbock's "Pleasures of Life;" and A. R. Wallace's work on Darwinism.

— Harper & Brothers will publish this month the second volume of W. P. Frith's "Autobiography and Reminiscences," and a new and revised edition of the "Manual of Historical Literature," by President C. K. Adams of Cornell.

— Wolcott & West, Syracuse, N.Y., will shortly publish "Theories of Knowledge," by Rev. W. D. Wilson, D.D., Professor Emeritus in Cornell University.

— D. C. Heath & Co. have just ready, in their series of Guides for Science Teaching, "Hints for Teachers of Physiology," by Dr. Henry P. Bowditch of the Harvard Medical School. It will show how a teacher may supplement his text-book instruction by simple observations and by experiments on living bodies or on organic material.

— Dodd, Mead, & Co. have in preparation the letters and diaries of Emin Pacha, which, besides containing matter of interest as biography, relate largely to the author's scientific investigations. The volume has for an introduction a biographical sketch of Emin, with two portraits, one of them recent. They have also in press Bayard Tuckerman's biography of Lafayette, to be issued in two volumes.

— T. Y. Crowell & Co., in connection with the announcement of a cheaper cloth and a paper edition of Tolstoi's great work, "Anna Karénina," translated by Nathan Haskell Dole, state that Dr. Dole's translations have been received with great favor by the Tolstoi family. In a recent letter to Mr. Dole, the Countess Tatiana Lyovna Tolstoi says, "My father has read your translations, and is much pleased with them. They are to his mind very carefully and accurately done."

— Ulric Blickensderfer, Chicago, Ill., has just issued "Blackstone's Elements of Law, etc.," with analytical charts, tables, and legal definitions, arranged and displayed by a systematic and attractive method. Mr. Blickensderfer is an attorney-at-law, and claims that these charts will be found time-saving helps to his colleagues. Sample copies may be had on application. He also has published a chart of the "Historical and Genealogical Descent of the Crown of England," which by an ingenious arrangement of types brings the history of England on one side of a sheet of paper six inches wide and eighteen inches long, which folds up like an ordinary legal document. The succession covers from A.D. 827 to the ascent of Queen Victoria in 1837.

— The article on "Climbing Mount St. Elias," to appear in *Scribner's* for April, is the work of an American member of the Alpine Club, Mr. William Williams, who, with two English fellow-members, succeeded, during the summer of 1888, in reaching the highest point ever attained on that mountain, — about 11,400 feet. Charles Francis Adams, president of the Union Pacific, will contribute a railroad article to the number, on the "Prevention of Strikes." He proposes a plan which, if carried out, would be almost a revolution in the relations of railroad employers and employees. William H. Rideing, who made a careful inspection of the great Clyde ship-yards during the past summer, will give a description of them, showing the various stages in "The Building of an Ocean Greyhound."

— Ticknor & Co.'s March books include "Dragon's Teeth," translated from the Portuguese of Eça de Queiros, by Mrs. Mary J. Serrano; and in their Paper Series, "Forced Acquaintances" (No. 53), by Edith Robinson, and "Under Green Apple Boughs" (No. 54), by Helen Campbell.